

WHAT IS CLAIMED IS:

1        1. A reflection-type liquid crystal display comprising:

2        a transparent first substrate;

3        a transparent electrode provided on said transparent first  
4        substrate;

5        a second substrate;

6        an insulator film which is provided on said second substrate  
7        and also on a surface of which is formed an uneven structure;

8        a reflecting electrode which is provided on said insulator  
9        film in such a shape as reflecting said uneven structure; and

10        a liquid crystal layer sandwiched by a side of said  
11        transparent electrode formed on said first substrate and a side  
12        of said reflecting electrode provided on said second substrate;

13        wherein said insulator film includes a first insulating  
14        layer in which a large number of depressions are irregularly  
15        arranged which are isolated (as surrounded by protrusions) and a  
16        second insulating layer which covers said first insulating layer  
17        entirely.

1        2. The reflection-type liquid crystal display according to

2        Claim 1, wherein said depressions are constructed by a part

3        surrounded by a large number of stripe-shaped protrusions

4        arranged irregularly.

1        3. The reflection-type liquid crystal display according to

2        Claim 1, wherein said uneven structure is formed by a repetition

3        of an irregular shape which is given in units of one picture element

4        or more.

1        4. The reflection-type liquid crystal display according to  
2    Claim 1, wherein said depressions and said protrusions each has  
3    a smooth sectional shape formed by melting.

1        5. The reflection-type liquid crystal display according to  
2    Claim 1, wherein:  
3    a liquid crystal driving switching element is provided on said  
4    second substrate; and  
5    said insulator film serves also as a protection film for said  
6    switching element.

1        6. The reflection-type liquid crystal display according to  
2    Claim 5, at least one of said first insulating layer and said second  
3    insulating layer covers at least one of a drain wiring line and  
4    a gate wiring line of said switching element.

1        7. The reflection-type liquid crystal display according to  
2    Claim 1, wherein at least one of said first insulating layer and  
3    said second insulating layer has photo-absorbancy.

1        8. The reflection-type liquid crystal display according to  
2    Claim 1, wherein:  
3        a liquid crystal driving switching element is provided on  
4    said second substrate; and  
5        a contact hole is formed in said insulator film for  
6    electrically interconnecting said liquid crystal driving  
7    switching element and said reflecting electrode.

1        9. The reflection-type liquid crystal display according to

2 Claim 1, wherein said first insulating layer is made of an organic  
3 or inorganic resin having photosensitivity.

1 10. The reflection-type liquid crystal display according  
2 to Claim 1, wherein said second insulating layer is made of an  
3 organic or inorganic resin having photosensitivity.

1 11. A method for manufacturing a reflection-type liquid  
2 crystal display including: a transparent first substrate, a  
3 transparent electrode provided on said transparent first  
4 substrate, a second substrate, an insulator film which is provided  
5 on said second substrate and also on a surface of which is formed  
6 an uneven structure, a reflecting electrode which is provided on  
7 said insulator film in such a shape as reflecting said uneven  
8 structure, and a liquid crystal layer sandwiched by a side of said  
9 transparent electrode formed on said first substrate and a side  
10 of said reflecting electrode provided on said second substrate,  
11 wherein said insulator film includes a first insulating layer in  
12 which a large number of depressions are irregularly arranged which  
13 are isolated as surrounded by protrusions and a second insulating  
14 layer which covers said first insulating layer entirely, said  
15 method comprising the steps of:

16 forming said first insulating layer;

17 forming, as a photolithography step, a resist pattern on said  
18 first insulating layer;

19 etching said first insulating layer;

20 removing a residual resist film left on said first insulating  
21 layer;

22 melting by heat treatment said first insulating layer thus

23 etched, to thereby smooth said uneven structure; and  
24 forming said second insulating layer on said first  
25 insulating layer thus melted.

1 12. A method for manufacturing a reflection-type liquid  
2 crystal display including: a transparent first substrate, a  
3 transparent electrode provided on said transparent first  
4 substrate, a second substrate, an insulator film which is provided  
5 on said second substrate and also on a surface of which is formed  
6 an uneven structure, a reflecting electrode which is provided on  
7 said insulator film in such a shape as reflecting said uneven  
8 structure, and a liquid crystal layer sandwiched by a side of said  
9 transparent electrode formed on said first substrate and a side  
10 of said reflecting electrode provided on said second substrate,  
11 wherein said insulator film includes a first insulating layer in  
12 which a large number of depressions are irregularly arranged which  
13 are isolated as surrounded by protrusions and a second insulating  
14 layer which covers said first insulating layer entirely, said  
15 method comprising the steps of:

16 forming said first insulating layer of an organic or  
17 inorganic insulating material having photosensitivity;

18 forming an uneven-element pattern on said first insulating  
19 layer by photo-exposure;

20 etch-developing said first insulating layer;

21 melting by heat treatment said first insulating layer thus  
22 etch-developed, to thereby smooth said uneven structure; and

23 forming said second insulating layer on said first  
24 insulating layer thus melted.

1           13. A method for manufacturing a reflection-type liquid  
2 crystal display including: a transparent first substrate, a  
3 transparent electrode provided on said transparent first  
4 substrate, a second substrate, an insulator film which is provided  
5 on said second substrate and also on a surface of which is formed  
6 an uneven structure, a reflecting electrode which is provided on  
7 said insulator film in such a shape as reflecting said uneven  
8 structure, a liquid crystal layer sandwiched by a side of said  
9 transparent electrode formed on said first substrate and a side  
10 of said reflecting electrode provided on said second substrate,  
11 a liquid crystal driving switching element provided on said second  
12 substrate, a contact hole formed in said insulator film for  
13 electrically interconnecting said liquid crystal driving  
14 switching element and said reflecting electrode, wherein said  
15 insulator film includes a first insulating layer in which a large  
16 number of depressions are irregularly arranged which are isolated  
17 as surrounded by protrusions and a second insulating layer which  
18 covers said first insulating layer entirely, said method  
19 comprising the steps of;

20           forming said second insulating layer of an organic or  
21 inorganic insulating material having photosensitivity;  
22           forming a pattern used to form said contact hole in said  
23 second insulating layer; and  
24           performing etch-developing on said second insulating layer,  
25 to thereby form said contact hole.

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